

REMARKS

Applicants amended claims 1, 5-6, 8-10, 14, 19, 36-40, added new claims 68-69, and cancelled claims 4, 7, 15, 17-18, 20, 27-28, 35, and 62 without prejudice. Applicants affirm the election of Group I, claims 1-40, 51-54, and 62, without traverse. Claims 41-50, 55-61, and 63-67 have been withdrawn.

Applicants also amended reference numeral 11 (in Figure 11) to reference numeral 110.

Claims 1-3, 5-6, 8-14, 16, 19, 21-26, 29-34, 36-40, 51-54, and 68-69 are pending in the application. Applicants address the Examiner's objections and rejections below.

Information Disclosure Statement

The Examiner noted that copies of the cited documents were not filed with the Information Disclosure Statement submitted on June 4, 2001. Applicants have provided copies of the cited documents with this Reply.

Specification

The Examiner objected to the disclosure because of informalities on page 15, line 23. Applicants have amended the specification in response to the Examiner's objection.

Claims Analysis

In interpreting "non-circular", the Examiner stated, "[A]ny battery having a housing with more than one opening would provide a 'non-circular' flux of gas." (Office Action, p. 4). But in some cases, a battery having a housing with more than one opening can provide a circular flux of gas. For example, a battery having a housing with multiple openings, at least one of the openings being circular, can provide a circular flux of gas. If one of the circular openings provides a circular flux of gas, and the circular flux does not overlap with fluxes created by the other openings, then the circular opening still provides a circular flux of gas.

Support for Applicants' interpretation of a "non-circular" can be found in Figure 3 of the application. Figure 3 shows a flux contour plot of one-quarter of an embodiment of a cathode

can with air access openings. Although the cathode can in Figure 3 has multiple air access openings, the specification states that, “Fig. 3 shows that a circular air access opening . . . facilitates or provides a circular flux of air (or oxygen) on a portion of the cathode adjacent to the air access opening.” (Application, p. 8, emphasis added). Thus, a circular air access opening in a cathode can with more than one air access opening can provide a circular flux of gas.

If the fluxes of the individual openings overlap, then they can form a bigger flux of gas that is non-circular. For example, in the application, “Fig. 12 shows that elongated and diffused oxygen fluxes can be provided by circular air access openings that are configured and positioned such that their individual oxygen fluxes partially overlap to provide one elongated, non-circular oxygen flux” (Application, p. 11). If the fluxes do not overlap, however, then each flux retains its own shape.

Claim Objections

The Examiner objected to claim 62 because of informalities. Applicants cancelled claim 62. Therefore, the Examiner’s objection to claim 62 is moot.

Claim Rejections – 35 U.S.C. § 102

U.S. 6,284,400 B1 (“Adey”)

The Examiner rejected claims 1-2, 4-7, 9-11, 14, 19, 21-25, 27-29, 30-35, 40, 51-54, and 62 under 35 U.S.C. § 102(e) as anticipated by U.S. 6,284,400 B1 (“Adey”).

As noted above, Applicants have cancelled claims 4, 7, 27-28, 35, and 62, which obviates the rejection for those claims. Pending claims 1-2, 5-6, 9-11, 14, 19, 21-25, 29, 30-34, 40, 51-54, and 68-69 are not anticipated by Adey, for at least the reasons provided below.

Amended claim 1 recites a battery comprising a cathode and a surface adjacent to the cathode, the surface defining a plurality of openings arranged to provide a generally non-circular flux of gas on a portion of the cathode. Adey does not disclose or suggest a battery having a surface with a plurality of openings arranged to provide a generally non-circular flux of gas on a portion of a cathode.

The Examiner stated that "Figure 5 [in Adey] depicts the spreading of oxygen over the reaction surface by the inventive air ports of Adey. As can be seen in Figure 5, the flux of gas facilitated by the openings is non-circular." (Office Action, p. 6). Applicants disagree with the Examiner's position. In Figure 5 of Adey, cathode can openings provide individual circular fluxes on the cathode. The individual circular fluxes do not overlap with each other, as Adey explains with reference to Figures 2 and 5: "FIGS. 2 and 5, in combination, illustrate the relatively shorter distances between the multiple ports 34 and the outer edges of the respective plumes [defined by enclosed areas 56] in a preferred cathode can of the invention." (Adey, col. 7, lines 49-52, emphasis added). In fact, Adey even notes in the Summary that, "the imaginary closed figures [which represent the plumes on the cathode] can touch each other without generally overlapping each other, and thus represent a footprint on the cathode assembly corresponding with the spacing of the ports on the bottom of the cathode can." (Adey, col. 3, lines 28-32, emphasis added).

Thus, Adey's circular plumes do not combine to form one bigger, non-circular flux of gas. Adey therefore does not anticipate claims 1-2, 5-6, 9-11, 51-52, and 68-69.

Amended claim 14 recites a battery comprising a housing with a surface defining an opening having an aspect ratio between about 3:2 and about 400:1. Adey does not disclose or suggest a battery with a housing that has a surface defining an opening with an aspect ratio between about 3:2 and about 400:1. In fact, Adey states that circular ports are preferred. (See Adey, col. 14, lines 8-10). Thus, Adey does not anticipate claims 14 and 53.

Amended claim 19 recites a battery with a housing that has a surface defining an elongated curved opening, wherein the opening is not an ellipse. A surface with non-elliptical, elongated curved openings is shown, for example, in Applicants' Figure 11. Adey does not disclose or suggest a battery with a housing defining a non-elliptical, elongated curved opening. Thus, Adey does not anticipate claims 19, 21-25, 29-34, 40, and 54.

U.S. 4,591,539 ("Oltman")

The Examiner rejected claims 1, 3-5, 11-12, and 51-52 under 35 U.S.C. § 102(b) as anticipated by U.S. Patent No. 4,591,539 ("Oltman").

As noted above, Applicants have cancelled claim 4.

Amended claim 1 recites a battery comprising a cathode and a surface adjacent to the cathode, the surface defining a plurality of openings arranged to provide a generally non-circular flux of gas on a portion of the cathode. Oltman does not describe or suggest a battery having a surface with a plurality of openings arranged to provide a generally non-circular flux of gas on a portion of a cathode. Thus, Oltman does not anticipate claims 1, 3, 5, 11-12, 51-52, and 68-69.

Claim Rejections – 35 U.S.C. § 103

The Examiner rejected claims 3, 8, 12-13, 15-18, 20, 26, and 30-39 under 35 U.S.C. § 103(a) as unpatentable over Adey as evidenced by Linden, Handbook of Batteries.

As noted above, Applicants have cancelled claims 15, 17-18, 20, and 35, which obviates the rejection for those claims.

Claims 3, 8, 12-13, 16, 26, 30-34, 36-39, and 68 depend from claim 1, 14, or 19, and are patentable for at least the same reasons discussed above. For example, Linden does not disclose or suggest a battery having a surface with a plurality of openings arranged to provide a generally non-circular flux of gas on a portion of a cathode, a battery housing with an opening having an aspect ratio between about 5:1 and about 50:1, or a battery comprising a housing with a surface defining a non-elliptical, elongated curved opening. Therefore, the claims are patentable over Adey as evidenced by Linden.

Applicants believe the claims are in condition for allowance, which action is requested.